Role of knowledge brokers in communities of practice in Japan

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Table 1

Pattern matrix factor loadings for multimembership scale

	Ⅰ	Ⅱ
I can form a definite opinion from diverse opinions through understanding of a common purpose.	.83	-.19
I speak up about my feelings in communities which have diverse opinions.	.80	-.18
I try to contribute to belonging communities with my own value.	.75	-.01
I can open up and start a conversation with a stranger.	.72	.04
I have contact with diverse people who have different views from my view.	.70	-.08
When I convey new things, I try to deliver a simple message with metaphor.	.58	.12
I do not stick to one's status and age for discussion.	.54	.13
I try to understand and persuade the opposite perspective.	.53	.07
I am open to differing views.	.49	.22
I am happy to see new members in belonging communities.	.41	.37
It is reasonable that we have many differing views.	-.22	.93
It is natural I face resistance because our views are different.	-.08	.80
It is important to understand different views.	.00	.71
It is natural that we face ambiguity because we cannot have an absolute fact.	-.12	.63
I enjoy new perspective through dialogue.	.27	.57
It is important to have associates who share my perspective.	.28	.54
I want to know diverse views.	.23	.52

Table2

Pattern matrix factor loadings for knowledge brokering scale

I have sought opportunities to gather information with diverse people.	.89
I sometimes introduce my acquaintance to my communities.	.80
I have regularly interacted with people who have the same beliefs as me beyond my workplace.	.79
I try to expand my perspective by interacting with diverse people.	.78
I enjoy creating communities with diverse people.	.77
I participate in communities involving people outside of my organization.	.77
I try to make a network of people outside of my organization to gather information.	.76
I try to gather valuable information from outside of my organization.	.74
I convey knowledge and information learned outside to my organization.	.73
I explain my opinion to people in other departments on a daily basis.	.72
I utilize learning opportunities outside of my office.	.72
I often take charge of communities as an organizer.	.70

Table 3

Pattern matrix factor loadings for career adaptability scale

	Ⅰ	Ⅱ	Ⅲ
I think about my future specifically.	.77	.14	-.09
I enjoy new opportunities.	.74	-.18	.12
I have a concrete plan for my future career.	.74	.01	.01
I prepare for my career development.	.73	.03	.05
I am adaptable enough for new surroundings.	.57	-.03	.07
I gather information for my career development in a positive manner.	.42	.32	-.08
I want to enrich my future career.	-.05	.78	.08
I am responsible for my career success.	.00	.76	-.07
I often think how my career should be.	.11	.71	-.12
I am concerned about my career.	-.05	.65	.08
I want to be responsible for my career.	-.06	.61	.25
I enjoy my job assignments.	.05	-.06	.89
I think I am fit for my job.	.02	.01	.77
I feel my job is important.	.05	.19	.60

Table 4

Means, standard deviations, and intercorrelations between knowledge brokering scale, multimembership scale, and career adaptability scale

Variables	*N*	*Mean*	*SD*	*α*	1	2	3	4	5	6
1.Knowledge brokering	412	2.62	0.84	.94	—					
2.Creation and integration of diverse opinions	412	3.06	0.69	.88	.74***	—				
3.Acceptance of diverse opinions	412	3.67	0.72	. 87	.28***	.63***	—			
4.Concern	412	2.88	0.73	. 85	.65***	.66***	.33***	—		
5.Control	412	3.45	0.77	. 85	.36***	.62***	.70***	.56***	—	
6.Confidence	412	3.14	0.95	. 85	.38***	.52***	.38***	.54***	.59***	—

Note. ***p<.001

Table 5

Ordinary least square regression

Variables	Model 1: Creation and integration of diverse opinions	Model 2: Acceptance of diverse opinions
	ß	ß
Age	.02	.02
Gender	-.02	.04
Postion	.08*	.04
Job change	-.03	.02
Concern	.41***	-.08
Control	.33***	.75***
Confidence	.09*	-.02
R^2	.54***	.50***
Adjuted R^2	.53***	.49***

Note. *p<.05,**p<.01,***p<.001

VIF:1.08-1.85

Gender: 1=female,0=male

Postion: 1=managerial class, 0=other classes

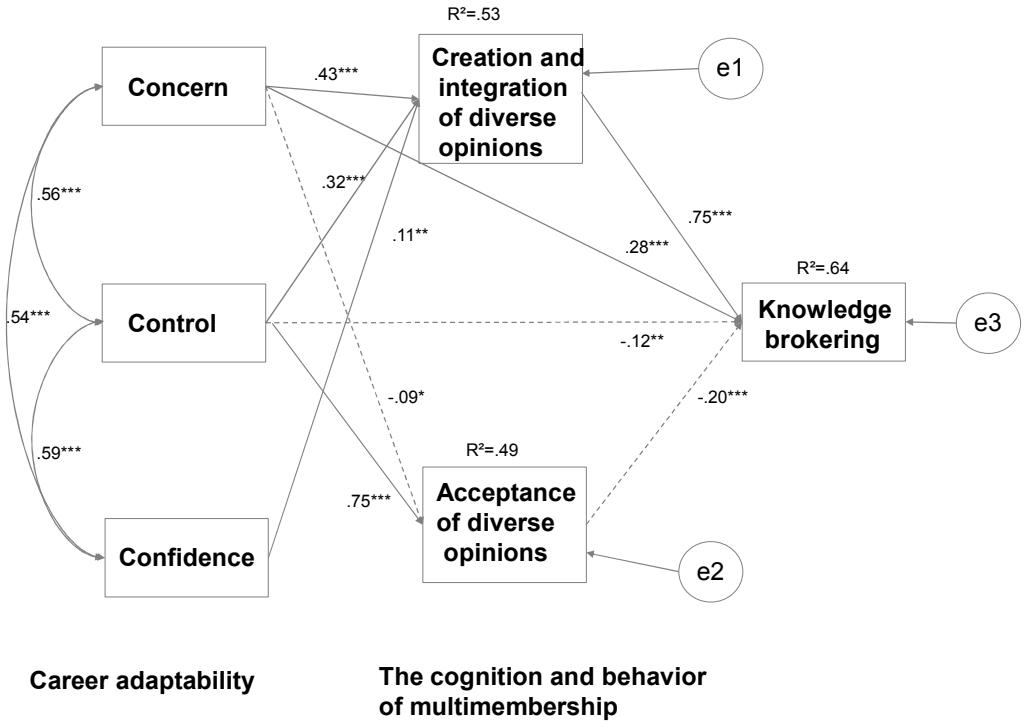
Job change: 1=change, 0=no change

Table 7

Direct effect, indirect effect, and total effect for knowledge brokering

Variables		Dependent variable Knowledge brokering
Concern	Direct effect	.28***
	Indirect effec	.34
	Total effect	.62
Control	Direct effect	-.12**
	Indirect effec	.09
	Total effect	-.03
Confidence	Direct effect	-
	Indirect effec	.08
	Total effect	.08
Creation and integration of diverse opinions	Direct effect	.75***
	Indirect effec	-
	Total effect	.75
Acceptance of diverse opinions	Direct effect	-.20**
	Indirect effec	-
	Total effect	-.20

***p<.001 **p<.01 *p<.05



Note. ***p<.001, **p<.01,*p<.05

Figure 1

Covariance structure analysis

Table 6

Three Ordinary least square regression models

Variables	ß:Knowledge brokering		
	Step1	Step2	Step3
Age	-.01	-.04	-.05
Gender	-.02	.00	.01
Postion	.14*	.02	.02
Job change	-.05	.01	.01
Creation and integration of diverse opinions		.93***	.76***
Acceptance of diverse opinions		-.31***	-.21***
Concern			.30***
Control			-.12*
Confidence			-.03
R^2	.02*	.60***	.64***
Adjusted R^2	.02*	.59***	.63***
$\triangle R^2$		.58***	.04***

Note. *p<.05,**p<.01,***p<.001

VIF:1.07-2.97

Gender: 1=female,0=male

Postion: 1=managerial class, 0=other classes

Job change: 1=change, 0=no change

Role of knowledge brokers in communities of practice in Japan

1 Purpose

Numerous studies have stressed the importance of the communities of practice (CoP) approach in a knowledge-based society. Wenger and Snyder (2002, p.139) defined CoPs as follows: "they are groups of people informally bound together by shared expertise and passion for a joint enterprise." Furthermore, participation in multiple CoPs at once was defined as multi-membership. Those who have multi-membership can act as knowledge brokers. Knowledge brokers can introduce practices into another CoP (Wenger, 1998, 2000).

Different CoPs have different practices that are unique and based on tacit knowledge. Therefore, if knowledge brokers try to connect across boundaries, it would not be easy. Miscommunication and misunderstanding are natural and common.

The purpose of this study is to investigate the role of knowledge brokers in CoPs. This is because if knowledge brokers can connect across boundaries and introduce practices into another CoP, they can contribute by introducing practices as tacit knowledge into another CoP.

In particular, in Japan, knowledge workers in external CoPs try to introduce external practices into internal CoPs (Araki, 2007, 2009; Ishiyama, 2013). One of the labor practices of Japanese-style human resource management is on-the-job training (OJT). Through OJT, Japanese companies can achieve high performance with a committed and skilled workforce (Moriguchi, 2013). However, to acquire new knowledge, Japanese knowledge workers have recently focused on external knowledge. Therefore, the focus of in this study is on Japanese knowledge workers who try to learn from external CoPs.

2 Approach

2.1 The difference between learning transition and legitimate peripheral participation

On one hand, in CoP, the importance of situated learning is stressed. On the other hand, in the learning transition model, learning occurs mostly in the classroom without any specific social context. In this model, learning is considered didactic instruction (Anderson *et al.*, 1996).

Situated learning has been tied to day-to-day activities (Lave, 1988), learning in

cognitive apprenticeship (Brown *et al.*, 1989) through social interaction. Lave and Wenger (1991) focused on social interaction in a shared practice of people and developed the CoP concept in situated learning. Furthermore, Lave and Wenger developed the legitimate peripheral participation theory. In the five apprenticeship examples, namely midwives in Yucatec, Vai and Golan tailors, quartermasters, meat cutters, and non-drinking alcoholics, legitimate peripheral participation is considered a learning process. In these five examples, the novices are considered to be legitimate members of CoP. They have legitimacy; therefore, even though they start off as peripheral in CoP, they can learn many of the things taking place in CoPs. After that, they can acquire more legitimacy and will consequently become young masters and old masters.

Lave and Wenger defined this learning process as participation. Participation includes contribution as novices, young masters, and old masters. Regardless of the member status, members in a CoP can learn tacit knowledge through this participation concept because they can access resources in CoP, thanks to their legitimacy. In this process, CoPs can generate knowledge; therefore, CoPs play an important role in knowledge creation.

2.2 Knowledge creation in communities of practice

Thereafter, Lave and Wenger (1991), Wenger (1998), Wenger and Snyder (2000), and Wenger *et al.*(2002) focused on knowledge creation, which is the unique feature of CoPs.In order to generate knowledge, CoPs have the following features;

Membership is voluntary as members join a CoP because of their interest, passion, and commitment to their expertise;

CoPs foster mutually beneficial cooperation, trust, and openness;

CoPs are informal and non-hierarchical;

CoPs can generate not only explicit knowledge but also tacit knowledge;

For instance, Hewlett Packard Company, Shell Oil Company, and the World Bank are large multinational companies in which CoPs play an important role as knowledge-emergent communities (Wenger *et al.*, 2002). Why can CoPs become knowledge-emergent communities?

The reason is that CoPs are different from formal organizations. The purpose of a CoP is to generate, build, and exchange knowledge. On the other hand, the purpose of formal organizations is to accomplish business goals or specific tasks (Wenger,1998; Wenger , *et al.*, 2002). Therefore, Wenger and Snyder (2000) stressed that senior executives should support CoPs and invest time in helping them as well as formal organizations.

Furthermore, multi-membership contributes to knowledge creation. Multi-membership is defined as belongingness to multiple CoPs (Wenger, 1998) and belongingness to CoPs and formal organizations at the same time (Wenger *et al.*, 2002). For instance, in Japan, knowledge workers join external CoPs that cross the border of workplaces for the purpose of individual career development (Araki, 2007, 2009; Ishiyama, 2013) or to learn the knowledge and skills that are essential to their formal tasks (Matsumoto, 2013; Nakanishi, 2013).

Araki (2008) argued these kinds of external CoPs can encourage vocational identities and career development for knowledge workers. Therefore, the CoP concept is extended from the apprenticeship model to the loose relationship model for knowledge workers.

These types of loose relationship models for knowledge workers can be applied to a wide variety of CoPs. For instance, significant learning and innovation are generated by informal CoPs (Brown and Duguid, 1991) and CoPs in Australian higher education (Nagy and Burch, 2009). Knowledge transfer and exchange are also observed between academics and practitioners on community policing in Scotland (Henry and McKenzie, 2012) and the Journal of Mental Health as CoPs (Ponton, 2014).

Nagy and Burch (2009) highlighted that people in CoPs do not necessarily work together every day. Furthermore, CoPs that have the features of being non-hierarchical, informal, lacking an actual leader, voluntary, and accumulating tacit knowledge are suited to professional groups. Henry and McKenzie (2012) emphasized "brokering CoP" to promote knowledge transfer and exchange between academics and practitioners.

Accordingly, such features of CoPs as being mutually beneficial, non-hierarchical, and open can contribute to knowledge creation. Thus, knowledge workers can utilize CoPs as a loose relationship model. However, Roberts (2006) highlighted that there is a significant difference between the two types of CoP. On one hand, CoPs are spontaneous, self-organizing, and small (Lave and Wenger, 1991). On the other hand, CoP can be found in large multinational organizations and can have large memberships. For example, the CoP in Shell Oil Company has 1500 members (Wenger *et al.*, 2002). Therefore, Roberts suggested that CoPs should be differentiated in terms of these features, although certain features may be common to all CoPs.

The author classifies CoPs into two categories depending on previous studies. According to Roberts, the nature of CoPs can be diverse depending on several features. The author classifies CoP into the homogenous and heterogeneous types. Homogenous types include CoPs with the five apprenticeships examples (Lave and Wenger, 1991) and those in insurance claim processing offices (Wenger, 1998). Heterogeneous types refer to the loose

relationship model for knowledge workers, as Nagy and Burch (2009) showed in the CoPs for Australian higher education. As previously mentioned, knowledge workers can utilize heterogeneous CoPs because the loose relationship model can be effective for knowledge creation. Therefore, for the purpose of investigating knowledge brokers, the author focuses on the heterogeneous CoPs in the succeeding pages.

Despite the difference between the homogenous and heterogeneous types, both have the common nature of legitimate peripheral participation. According to Wenger *et al.* (2002), heterogeneous CoPs have a certain domain. Domain refers to interest and expertise, which are connected to membership. In other words, the members of a CoP have passion, commitment, and identification with the interest related to the domain. Such passion, commitment, and identification generate legitimacy. However, if legitimacy is fixed, CoPs tend to lose flexibility and openness. To avoid this kind of immobilization, heterogeneous CoPs try to acquire new members. Therefore, heterogeneous CoPs have diverse members that include novices, young masters, and old masters. This feature shows the framework of legitimate peripheral participation.

2.3 Knowledge broker and gatekeeper

As previously noted, knowledge brokers are those who have multi-membership (Wenger, 1998) and who introduce the practices of a CoP to another CoP (Wenger, 2000). This concept of practice means doing in a historical and social context, and it includes the language, tools, documents, images, and symbols as the explicit. It also includes the implicit relations, tacit conventions, subtle cues, and untold rules of thumb as the tacit knowledge (Wenger, 1998). In other words, it includes the explicit and the tacit (Wenger *et al*, 2002).

As an example, knowledge brokers are brokering through discursive practice among CoPs of engineers, site foremen, and main contractors (Gherardi and Nicolini, 2002). Japanese knowledge workers in external CoPs formed an informal study group of global human resource development, and they introduced external practices into internal CoPs (Ishiyama, 2013).

Brown and Duguid (2001) argued that knowledge is described as contradictory views, i.e., sticky and leaky or tacit and explicit. These contrary descriptions of knowledge are created by practice in CoPs. Therefore, the role of knowledge brokers and brokering practices among CoPs is important. This effect of knowledge brokering is similar to the concept of learning by expanding (Engeström, 1987, 2008). Learning by expanding stresses the importance of horizontal movement and boundary crossing. The concept of CoP is influenced by learning by expanding. Furthermore, brokering should interconnect

different CoPs with practice. In this case, knowledge brokers need to utilize horizontal movement and boundary crossing.

Having defined and described the nature of knowledge brokers, it is helpful to compare other similar concepts, such as a gatekeeper. For the innovative performance of a firm, it is critical to have the capability labeled as a firm's absorptive capacity, which refers to the ability of a firm to recognize the value of new, external information (Cohen and Levinthal, 1990).

The actor who provides new and external information to other organization members is called a gatekeeper or boundary spanner. In research and technical laboratories, gatekeepers are important contributors to organizations. Gatekeepers are sociometric communication stars that use various sources, such as the literature and oral sources (Allen and Cohen, 1969).

However, the process of gathering and transmitting information is not simple. Gatekeepers need to assume special boundary roles to link the internal network to the external source at several organizational boundaries, in line with the nature of the organization's work (Tushman, 1977). For instance, a gatekeeper in an R&D project is important depending only on the circumstances, such as the case of development projects with complex technologies. If conducting basic research or using well-established technologies, there is little need for gatekeepers (Allen *et al.*, 1979). Furthermore, Boari and Riboldazzi (2014) argued about how actors who are positioned in a network can evolve into knowledge brokers. However, in this context, the label of knowledge brokers refers to gatekeepers because the focus is on different brokerage roles in line with the status of different organizations.

Compared with that on knowledge brokers, the literature on gatekeepers focused on the function of knowledge transfer in organizations. Such literature stressed the concept of contingency relative to different organizations' work or the nature of their projects. Meanwhile, the focus of knowledge brokers in CoPs is on learning through the interaction between individuals and the organization. According to the legitimate peripheral participation theory, knowledge brokers in CoP can learn tacit knowledge through participation as the contribution for their CoP. At the same time, through horizontal movement and boundary crossing, knowledge brokers introduce external practices into internal CoPs. This process refers to learning by expanding.

However, introducing external practices into internal CoPs is not easy. In Japan, knowledge workers can acquire company-specific knowledge through OJT with organizational commitment (Moriguchi, 2013). Therefore, internal CoPs whose members

possess company-specific knowledge and organizational commitment tend to be homogenous. Araki (2007, 2009) and Ishiyama (2013) argued that knowledge brokers who attempt to introduce external practices into internal CoPs face difficulties owing to the homogeneity of internal CoPs. Thus, one of the important roles of knowledge brokers is to change the culture of internal CoPs.

2.4 Career adaptability

In Japan, Araki (2007, 2009) suggested that boundary crossing and brokering between external and internal CoPs contributed to the career development of knowledge brokers. The boundaryless career theory focuses on boundary crossing. A boundaryless career is the opposite of the concept of an organizational career. Specific meanings relate to crossing career boundaries, such as moving across separate employers, practicing with marketability, sustaining external networks, and so on (Arthur, 2004).

However, Gunz *et al.* (2000) argued that a boundaryless career is a highly modern concept, and career boundaries have become considerably more complex. Therefore, it is suggested that pure boundarylessness be seen as a special case that occurs under certain very special circumstances. This means that career boundaries still exist, but they have changed to become more complex situations. Thus, Inkson *et al.* (2012) suggested that career theories should focus on the creation and crossing of career boundaries because there are so many variations of career boundaries. Career actors have been significantly affected by the experience of career boundary crossing.

Career adaptability is a theory related to career boundary crossing. Savickas (1997) defined career adaptability as "the readiness to cope with the predicable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions" (Savickas, 1997, p. 254). That is the responsive capability toward the uncertain world.

Savickas (2005) defined four dimensions of career adaptability, namely concern, control, curiosity, and confidence. Masuda (2008) created a career adaptability scale in line with these four dimensions. In a survey of three Japanese companies, Masuda found career adaptability to be positively related to the recognition of the career transition of employees.

Thus, these findings mean that career actors who have career adaptability have a tendency to adopt career boundary crossing. Furthermore, CoP boundaries comprise one of the categories of career boundaries. Therefore, career adaptability is an important concept for knowledge brokers.

2.5 Hypothesis of knowledge brokers

Knowledge brokers have multi-membership and introduce the practices of CoPs into another CoP. Ishiyama (2013) argued that Japanese knowledge workers have "knotworking skill," "community skill," and "acceptance of diverse opinions" as the features of cognition and behavior for multi-membership.

The notion of knot means the "rapidly pulsating, distributed, and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and activity systems" (Engeström, 2008, p. 194). Therefore, knotworking is an adequate concept to describe the tying of loosely connected knowledge workers without the perspective of the center of coordination or control in external CoP. The feature of knotworking skill deals with loosely connected actors who have diverse opinions extemporarily in the short term.

Community skill refers to the coordination of various members of a CoP, such as novices, young masters, and old masters. Araki (2007, 2009) highlighted that the essential role of a heterogeneous CoP is as a coordinator. Coordinators should give full consideration to diverse members to energize CoP activities because all CoP members need to have passion, commitment, and identification depending on their participation level.

Multi-membership is a necessary condition needed to be a knowledge broker. Therefore, the author predicts that:

Hypothesis 1. The scale of multi-membership in CoPs consists of the features of cognition and behavior as "knotworking skill," "community skill," and "acceptance of diverse opinions."

With multi-membership, knowledge brokers perform the knowledge brokering between internal and external CoPs. Knowledge brokering is similar to the concept of learning by expanding (Engeström, 1987, 2008), and it introduces discursive practices, including explicit and tacit knowledge, from one CoP into another CoP. Therefore, the author predicts that:

Hypothesis 2. The scale of knowledge brokering among CoPs consists of building relationships and gathering information in external CoPs and introducing practices into internal CoPs purposefully.

Previous studies have suggested that career adaptability is the theory that refers to the

readiness to cope with the unpredictable changes in work and working conditions. Therefore, career adaptability prompts the cognition and behavior of career boundary crossing, which includes CoP boundaries. This means that career boundary crossing is the same as CoP boundary crossing. In other words, career adaptability prompts the cognition and behavior of multimembership. Therefore, the author predicts that:

Hypothesis 3. Career adaptability is positively related to the cognition and behavior of multimembership.

As previously discussed, knowledge workers with multi-membership in internal and external CoPs can contribute to knowledge creation and develop their identities. This kind of knowledge creation based on multi-membership is essential for knowledge brokering. In other words, multi-membership is a prerequisite to becoming a knowledge broker. Therefore, the author predicts that:

Hypothesis 4. The cognition and behavior of multi-membership is positively related to knowledge brokering.

As noted earlier, prior studies have not examined whether and how the cognition and behavior of multi-membership may mediate the relationship between career adaptability and knowledge brokering. The author examines the mediating effects of the cognition and behavior of multi-membership.

Ishiyama (2013) argued that knowledge brokering generates a backlash in internal CoPs. This is because, as noted earlier, in a Japanese cultural context, internal CoPs tend to be homogenous, and their members tend to refrain from accepting new knowledge. To deal with such conflict, career adaptability is effective. Career adaptability is the readiness to cope with the uncertain world. Moreover, it can deal with career boundary crossing. Thus, career adaptability could prompt the features of cognition and behavior of multi-membership. Multi-membership deals with loosely connected actors. Career actors who have career adaptability are accustomed to dealing with people with diverse opinions. Therefore, career actors who have career adaptability and multi-membership in internal and external CoPs are accustomed to such conflicts, which involve the confrontation of diverse opinions. Therefore, the author predicts that:

Hypothesis 5. The cognition and behavior of multi-membership mediates the relationship between career adaptability and knowledge brokering.

3 Methodology

3.1 Sample

In this study, the author analyzed the data from 412 regular employees in Japanese companies. Japanese companies tend to divide their employees into two groups: employees who share their companies' expectation of long-term service and employees who neither expect long-term service nor are committed to their companies (Takanashi, 1999). Regular employees are those who share their companies' expectation of long-term service. Thus, in many cases, regular employees have organizational commitment, to some extent. Furthermore, Nonaka and Takeuchi (1995) argued that regular employees in Japanese companies generate tacit and explicit knowledge in the informal and flexible organization layer. They defined the layer as the knowledge-based layer in a hypertext organization. The nature of the knowledge-based layer is similar to that of internal CoPs. Thus, the author posits that regular employees in Japanese companies participate in an internal CoP in many situations.

Knowledge brokers play important roles in knowledge organizations as regular employees because they have organizational commitment to some extent. Owing to their organizational commitment, they try to perform knowledge brokering between external and internal CoPs. Therefore, I focused on regular employees in Japanese companies. Moreover, participants were chosen from a wide range of industrial sectors to examine the commonalities among knowledge brokers in Japan. Participants received online questionnaires, which were used to collect a wide range of samples throughout Japan via the web system of Macromill, Inc. from November 14 to 15, 2013. The sample consisted of 295 males and 117 females with an average age of 42.45 (SD = 10.15).

3.2 Measurements

In all measurements, a five-point Likert-type scale with anchors of 1 (*strongly disagree*) to 5 (*strongly agree*) was used.

Multimembership

The author assessed "the cognition and behavior of multimembership" using original items based on the concepts of "knotworking skill," "community skill," and "acceptance of diverse values," which were generated through an interview (Ishiyama, 2013).

Knowledge brokering

The author assessed "knowledge brokering" using the items from Miwa's (2011) "external interaction and learning," Ishiyama's (2011) "cross-border learning," and original items based on the concept of "knowledge brokering from external CoPs to internal CoPs," which were generated through an interview (Ishiyama, 2013).

Career adaptability

The author assessed "career adaptability" using the items from Masuda's (2008) scale. The scale consists of four subscales and 18 items. The four subscales are based on the four dimensions of career adaptability, namely concern, control, curiosity, and confidence, which were proposed by Savickas (2005).

4 Findings

4.1 Measurements

An exploratory factor analysis on all measurements was performed using principal axis factoring and promax rotation. With respect to the multi-membership scale, the eigenvalues and the scree plot of the initial principal axis factoring results indicated that a two-factor solution would be appropriate. Based on the initial principal axis factoring results, items that were low factor loadings were removed, and the remaining items were then subjected to principal axis factoring restricted to two factors. When the solution was restricted to two factors, the items were clearly loaded on two separate factors (see Table 1 for the rotated pattern matrix).

Table 1

The first factor consisted of 10 items, which showed the feature of knotworking skill and community skill. The 10 items included cognition and behavior, which showed the interaction with someone new and diverse, thus eliciting a great variety of views from those people and integrating those views into new ideas. Therefore, the author named the first factor as "creation and integration of diverse opinions." The Cronbach's alpha for this scale was 0.88, which was acceptable.

The second factor consisted of seven items, which showed the feature of acceptance of diverse values. The seven items included cognition, which showed the acceptance of new and divers values, opinions, and views. Therefore, the author named the second factor as "acceptance of diverse opinions." The Cronbach's alpha for this scale was 0.87, which was acceptable.

The common denominator of both factors was welcoming diverse opinions. However, on one hand, the second factor only positively accepted the diverse opinions. It did not intend to integrate these opinions. On the other hand, the first factor included the intention to integrate diverse opinions and create new ideas.

Therefore, Hypothesis 1 was partially supported. The multi-membership scale included the feature of cognition and behavior as "knotworking skill," "community skill," and "acceptance of diverse opinions." However, the scale consisted of only two factors, namely "creation and integration of diverse opinions" and "acceptance of diverse opinions."

With respect to the knowledge brokering scale, the eigenvalues and the scree plot of the initial principal axis factoring results indicated that a one-factor solution would be appropriate. Based on the initial principal axis factoring results, items that were low factor loadings were removed, and the remaining 12 items were then subjected to principal axis factoring restricted to one factor. When the solution was restricted to one factor, the items were clearly loaded on one factor (see Table 2).

Table 2

As predicted, this factor includes the behavior that showed building relationships and gathering information in external CoPs and introducing practices into internal CoPs purposefully. Therefore, the author named this factor as "knowledge brokering." The Cronbach's alpha for this scale was 0.94, which was acceptable. Therefore, Hypothesis 2 was supported.

With respect to the 18 items of the career adaptability scale, the eigenvalues and the scree plot of the initial principal axis factoring results indicated that a three-factor solution would be appropriate. Based on the initial principal axis factoring results, items that were low factor loadings were removed, and the remaining items were then subjected to principal axis factoring restricted to three factors. When the solution was restricted to three factors, the items were clearly loaded on three factors (see Table 3).

Table 3

The first factor consisted of four items from Masuda's "concern" and two items from Masuda's "curiosity." The two items of curiosity showed the cognition of coping with environmental changes. Thus, these items can be construed as concern for the environment. Therefore, the author named this factor as "concern." The second factor consisted of five items from Masuda's "control." Therefore, the author named this factor as "control." The third factor consisted of three items from Masuda's "confidence." Therefore, the author called this factor "confidence." The Cronbach's alpha for "concern" was 0.85, that for "control" was 0.85, and that for "confidence" was 0.85, all of which were acceptable.

4.2 Regression analysis

To test Hypothesis 3 and 4, the author conducted a series of regression analysis. Table 4 presents the means, standard deviations, correlations among variables, and Cronbach's alpha.

Table 4

For each equation, the author first included the following control variables: age, gender, position, and job change. As noted earlier, knowledge workers in Japan can develop their skills through OJT, suggesting that stable employment in a single company can affect the skill acquisition of knowledge workers in Japan. Therefore, the author included position and job change, which are factors of employment, as control variables. Subsequently, the author incorporated the predictors into an equation.

Table 5

Table 5 displays the result of an ordinary least squares regression for "creation and integration of diverse opinions" and "acceptance of diverse opinions." Model 1 in Table 2 showed that after controlling for the control variables, "concern" and "control" were positively and significantly related to "creation and integration of diverse opinions." Model 2 in Table 2 showed that only "control" was positively and significantly related to "acceptance of diverse opinions." Overall, the factors of career adaptability were positively related to the multi-membership scale. Therefore, Hypothesis 3 was supported.

Table 6

Table 6 displays the three ordinary least squares regression models. Step 1 reported the results for the control variables. Step 2 added the multi-membership scale, and Step 3 added the career adaptability scale.

As shown in Step 2, on one hand, "creation and integration of diverse opinions" was positively and significantly related to "knowledge brokering." On the other hand, "acceptance of diverse opinions" was negatively related to "knowledge brokering," suggesting that the factors of the multi-membership scale were positively and partially related to knowledge brokering. Thus, Hypothesis 4 was partially supported.

As shown in Step 3, "concern" was positively and significantly related to "knowledge brokering." On the other hand, "control" was negatively related to "knowledge brokering." This finding suggests that the factors of career adaptability have both positive and

negative effects on knowledge brokering.

4.3 Covariance structure analysis

Step 3 in Table 6 suggests that the factors of career adaptability have both positive and negative effects on knowledge brokering. However, whether and how the cognition and behavior of multi-membership may mediate the relationship between career adaptability and knowledge brokering remains unclear. Therefore, to test Hypothesis 5, the author employed the covariance structure analysis using IBM SPSS Amos.21.

Figure 1 displays the result of the covariance structure analysis. The GFI of 999, the AGFI of 0.992, the CFI of 1.000, and the RMSEA of 0.000 showed that the hypothesized model fits the data reasonably well.

Figure 1

Table 7 shows the direct effect, the indirect effect, and the total effect for "knowledge brokering."

Table 7

With respect to Hypothesis 5, "concern" had both positive direct and indirect effects through "creation and integration of diverse opinions" on "knowledge brokering." The total effect of "concern" on "knowledge brokering" was positive.

On the other hand, "control" had both negative direct and indirect effects through "acceptance of diverse opinions" on "knowledge brokering." Furthermore, "control" had a positive indirect effect through "creation and integration of diverse opinions" on "knowledge brokering." The total effect of "control" on "knowledge brokering" was positive. "Confidence" had only a positive indirect effect through "creation and integration of diverse opinions" on "knowledge brokering."

Overall, the factors of career adaptability were positively related to the knowledge brokering scale through the multi-membership scale, although "control" had both negative direct and indirect effects. Therefore, Hypothesis 5 was partially supported.

5 Conclusions

5.1 Summary of conclusions

This article focuses on knowledge brokers in CoPs who have multimembership and who introduce practices from one CoP to another CoP. Therefore, the author developed a theoretical model for knowledge brokers. First, knowledge brokers purposefully gather information in external CoPs and introduce these practices into internal CoPs. Second, the features of cognition and behavior of knowledge brokers are "knotworking skill," "community skill," and "acceptance of diverse opinions." Lastly, career adaptability is positively related to the cognition and behavior of multi-membership and the cognition and behavior of multi-membership is positively related to knowledge brokering. Furthermore, the cognition and behavior of multi-membership mediates the relationship between career adaptability and knowledge brokering. To test the hypothesis, the author collected data from 412 regular employees in Japanese companies.

In line with the predictions, the results show that the cognition and behavior of multi-membership was composed of two factors: "creation and integration of diverse opinions" and "acceptance of diverse opinions."

With respect to Hypothesis 3 through 5, overall, the career adaptability scale was positively related to the knowledge brokering scale through the multi-membership scale. However, "control," one of the factors of career adaptability, had both negative direct and indirect effects on "knowledge brokering." "Acceptance of diverse opinions," one of the factors of the cognition and behavior of multi-membership, was negatively related to "knowledge brokering."

5.2 Implications for researchers and practitioners

5.2.1 Theoretical implications

This article contributes to the literature as follows:
With respect to the multi-membership scale, "creation and integration of diverse opinions" was positively related to "knowledge brokering." On the other hand, "acceptance of diverse opinions" was negatively related to "knowledge brokering." This finding suggests that the influence of multi-membership on knowledge brokering is complex.

"Acceptance of diverse opinions" includes the cognition that shows the acceptance of new and divers values, opinions, and views. However, it does not include proactive behavior, such as speaking up about one's opinion in such a diverse environment or integrating diverse views into new ideas. On the other hand, "creation and integration of diverse opinions" includes the kind of proactive behavior that shows the integration of diverse views.

This finding suggests that "acceptance of diverse opinions" may mean a passive attitude for knowledge brokering. Given that it may only refer to the cognition of the acceptance of diversity, it cannot lead to proactive behavior for the integration of diverse views. On the other hand, it is suggested that "creation and integration of diverse opinions" can play an important role in knowledge brokering. This suggests that multi-membership in CoPs could generate a proactive as well as passive attitude towards knowledge brokers. Therefore, this article contributes to the mechanism of multi-membership. It includes the complex attitudes of actors in CoPs.

With respect to the factors of career adaptability, they were generally positively related to the multi-membership scale and the knowledge brokering scale. In particular, "concern" was positively related to "creation and integration of diverse opinions" and "knowledge brokering." However, "concern" was negatively related to "acceptance of diverse opinions." Furthermore, "control" had both negative direct and indirect effects on "knowledge brokering."

"Concern" includes the planning for one's career development, the cognition of coping with environmental changes, and gathering information with curiosity. The results show that such a kind of career attitude can play an important role in knowledge brokering. This career attitude could lead to proactive behavior towards knowledge brokers. This is because "concern," which includes readiness for environmental changes, can involve conflict with other CoP members for the purpose of integrating diverse views.

"Control" means the cognition and behavior of self-determination and autonomy for one's career (Savickas, 2005). It may be suggested that this kind of independence does not promote the cognition and behavior that influence diverse people to change their mind. Therefore, "control" has a negative effect on knowledge brokering, which includes the behavior to affect diverse people.

In conclusion, this study contributes to the findings that show the complexity of multi-membership and career adaptability. Upon closer examination, each subscale of multi-membership and career adaptability shows different effects on knowledge brokering. In other words, this study reveals the importance of proactive behavior in integrating diverse opinions for knowledge brokering.

5.2.2 Practical implications

As noted, Japanese companies have the tendency to focus on OJT because it can generate a committed and skilled workforce (Moriguchi, 2013). However, this study reveals the

importance of multi-membership in external CoPs for knowledge workers. If Japanese companies realize the importance of knowledge creation, they need to promote knowledge brokering between internal and external CoPs.

To promote knowledge creation, Japanese companies should develop their knowledge workers as knowledge brokers so that knowledge brokering can create knowledge internally. However, as noted earlier, knowledge brokers who attempt to introduce external practices into internal CoPs face difficulties owing to the homogeneity of internal CoPs. Thus, Japanese companies should encourage their knowledge workers to overcome such difficulties. To do so, Japanese companies should pay attention to the importance of multi-membership and career adaptability, because both have a positive effect on the knowledge broker scale. At the same time, Japanese companies should pay attention to the complexity of multi-membership and career adaptability.

In the subscale of multi-membership, "creation and integration of diverse opinions" has a positive effect on knowledge brokering. In the subscale of career adaptability, "concern" has a positive effect on knowledge brokering.

In particular, Japanese companies should include the elements of mindset focused on career concern, external orientation, and integration of diversity in their career development policy and training because both "creation and integration of diverse opinions" and "concern" have such kinds of elements. Meanwhile, too much emphasis on independence in companies' career development policy should be taken with caution. Both "control" and "acceptance of diverse opinions," which have the aspect of independence, have negative effects on knowledge brokering.

5.3 Limitations of research

This study only focuses on Japanese knowledge workers who try to learn from external CoPs. In particular, the focus only covers knowledge brokers who have multi-membership among internal and external CoPs. Therefore, this study does not cover other kinds of knowledge brokers. Furthermore, the context of knowledge brokering in Japanese culture might be very different from that in another culture.

Given that the data presented in this study are limited to knowledge brokers in Japanese CoPs, the study needs to be extended to an international context and to other kinds of knowledge brokers.

5.4 Areas of future study

This study does not cover the effect of knowledge brokering on companies' performance. It is possible that knowledge brokering, which contributes to knowledge creation with external perspectives, may affect companies' performance. Thus, the author recommends that future research should cover these areas to clarify the mechanism of knowledge brokering.

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